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THE FIRST SEVENTY-FIVE YEARS OF THE MEMPHIS CHRISTMAS BIRD COUNT

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On 15 December 2002, the Memphis Chapter of the Tennessee Ornithological Society (TOS) conducted the 75th consecutive Christmas Bird Count (CBC) in Memphis, Tennessee. This paper summarizes the origins of the count and results from the first 75 years.

Audubon Society Christmas Bird Count. The Christmas Bird Count is a project sponsored by the National Audubon Society and the Cornell Laboratory of Ornithology. Its primary objective is the ongoing monitoring of wild bird populations. The Audubon Society and ornithologist Frank Chapman developed this project as an alternative to traditional Christmas Day "side hunts" of songbirds, to encourage the counting, rather than the killing, of birds at Christmastime. The first counts took place 25 December 1900 at 25 locations in the United States and Canada. Each count was, and continues to be, conducted within a circle 15 miles in diameter. Since 1900 the window of time accepted for each individual CBC has changed from only one day (25 December) in the early years to any single day within the currently designated three-week count period (14 December to 5 January). There are currently more than 2,000 such counts; most are located in North America, with some in Central and South America, the West Indies, and the Pacific. Over 55,000 volunteer observers participate in counts annually. The National Audubon Society formerly printed the results of CBCs in its ornithological publication, variously titled *Bird-Lore*, *Audubon Field Notes*, and *American Birds*. In recent years, only a summary of the count results has been printed in booklet form. Christmas Bird Count results, in electronic form for most recent and past counts, can be accessed via the following website: www.audubon.org/bird/cbc/

Origins of CBCs in Tennessee. Trabue (1965) records a history of CBCs in the state. Tennessee's first count was in Knoxville on 25 Dec. 1902. Two additional east Tennessee locations provided early CBCs: Tazewell, Claiborne County in 1909 and from 1912-1915; and Copperhill, Polk County in 1915. Nashville's CBCs began in 1914, and Memphis CBCs were first run in 1928. These five counts were the only ones conducted in Tennessee prior to 1930 (Trabue 1965).

The journal of the TOS, *The Migrant*, which originated in 1930, has published Tennessee CBCs since 1931, when the 1930 counts (Nashville, Memphis, and Knoxville) were presented in tabular form (*Migrant* 2: 4-5). Subsequently, interest in Christmas Bird Counts increased dramatically in the state: during the 1930s, 20 new CBCs were added (Trabue 1965).

Early years of the Memphis CBC. Upon arriving in Memphis in 1928, the late Ben B. Coffey, Jr. began a substantial and noteworthy amateur career studying and chronicling the local bird-life of west Tennessee, northern Mississippi, and eastern Arkansas. On 25 December 1928, he conducted the first Memphis CBC. The sole observer, he noted 42 species of 1,994 individuals.

In 1929 Coffey enlisted four additional observers to assist him in the count. In 1930 he founded the Memphis Chapter of the TOS; since then, the chapter has sponsored the Memphis count.

The 1931 Memphis CBC was published in *The Migrant* the following year (*Migrant* 3: 7-8). Nevertheless, the 1931 Memphis count does not appear in the database housed at the Audubon website. The deadline for submitting count results to the Audubon Society was 30 December 1931. Unfortunately, Ben Coffey barely missed the deadline, receiving a letter dated 3 January 1932 stating that the count was received too late to include in *Bird-Lore*.

OVERVIEW

Sources. The primary sources consulted for the information presented below is the National Audubon Society website (mentioned above). For the year 1931, which was not accepted by Audubon, and for the years 1962-1971, a period for which the Audubon site has numerous errors, the annual Tennessee CBC reports published in *The Migrant* provided the data. Errors in the data, resulting primarily from inadvertent omissions and typographical mistakes, were corrected by consulting original field cards and unpublished notes of Ben Coffey and Martha Waldron housed in the Memphis TOS archives of the chapter curator.

Basic information. Table 1 records the date and effort (number of observers, parties, and party-hours), along with the total number of species and individuals, for each of the first 75 Memphis counts. Next to the species total for count day is given the number of additional species found during the so-called "count week."

Apparently, the CBC has always allowed for the inclusion of species present that, for whatever reason, might have been missed on count day, by defining a time known as "count week." Currently, the three days before and the three days after the day of the count are accepted as the count week. It is evident that historically, birds observed outside this time frame, but within the period in which counts

Table 1. Count dates, effort data, and number of bird species and individuals for the Memphis Christmas Bird Count, 1928-2002

		Effort			Number of Species		
Year	Date	# Observers	Max.# Parties	# Party Hrs	Count Day	Count Week	Total Indiv.
1928	25-Dec	1	1		42	6	1,994
1929	22-Dec	5		32	59	4	1,973
1930	21-Dec	5			50	13	2,120
1931	25-Dec	7			55		4,367
1932	25-Dec	5			53	1	2,204
1933	23-Dec	12			67	3	8,764
1934	24-Dec	11	5		59	3	3,772
1935	22-Dec	19			70		8,112
1936	26-Dec	20			70	1	16,169
1937	24-Dec	21			66	1	7,570
1938	24-Dec	21			64		7,359
1939	24-Dec	20		92	73		10,952
1940	22-Dec	23	11	77	72		8,993
1941	21-Dec	22		67	78	4	14,658
1942	20-Dec	20	10	60	75	3	21,832
1943	19-Dec	20	7	55	62		19,220
1944	31-Dec	17	6	38	64		4,727
1945	30-Dec	26	7	56	73		70,033
1946	22-Dec	28	8	88	65		28,477
1947	21-Dec	33	7	113	74		29,733
1948	26-Dec	31	9	90	73		92,636
1949	26-Dec	28	8	85	68	1	22,144
1950	24-Dec	31	8	92	75		9,636
1951	23-Dec	30	10	94	82		26,006
1952	21-Dec	24	8	86	80	1	808,381
1953	27-Dec	30	8	99	79		307,654
1954	26-Dec	26	8	98	75	1	170,286
1955	26-Dec	30	8	107	81		1,210,459
1956	23-Dec	17	8	81	79		1,013,854
1957	22-Dec	20	9	86	82		3,510,064
1958	21-Dec	27	7	82	75		1,017,972
1959	27-Dec	31	7	80	69	1	709,270
1960	26-Dec	29	7	86	74		2,008,847
1961	24-Dec	23	7	77	76	5	39,060
1962	23-Dec	21	6	74	70		809,061
1963	22-Dec	23	6	28	54		23,762
1964	27-Dec	24	7	75	63		308,228

		Effort			Number of Species		
Year	Date	# Observers	Max.# Parties	# Party Hrs	Count Day	Count Week	Total Indiv.
1965	26-Dec	28	7	73	75		14,431
1966	26-Dec	33	9	85	79		49,435
1967	23-Dec	22	9	80	71	4	34,824
1968	22-Dec	19	7	68	68	2	61,690
1969	21-Dec	23	8	69	60	2	19,667
1970	27-Dec	21		60	70		13,990
1971	19-Dec	22	7	61	79	1	13,691
1972	17-Dec	21	7	57	78		33,094
1973	16-Dec	22	8	60	65		44,044
1974	15-Dec	25	8	58	68	2	58,339
1975	21-Dec	28	12	66	82		27,805
1976	19-Dec	34	12	102	77		21,940
1977	18-Dec	29	12	102	77		25,075
1978	17-Dec	36	14	126	87		46,795
1979	16-Dec	33	14	126	84		33,631
1980	21-Dec	37	13	126	83		25,404
1981	20-Dec	34	13	128	84		1,026,106
1982	19-Dec	35	13	125	81		33,670
1983	18-Dec	36	13	124	91	1	171,021
1984	16-Dec	45	13	128	92		922,563
1985	22-Dec	41	13	130	87	1	18,771
1986	21-Dec	39	14	127	87		126,038
1987	20-Dec	40	14	125	92		25,586
1988	18-Dec	41	14	128	90	1	33,735
1989	17-Dec	37	10	126	99	3	21,532
1990	16-Dec	46	15	128	92	2	21,283
1991	15-Dec	38	12	120	91		54,017
1992	20-Dec	37	9	95	90	6	16,147
1993	19-Dec	47	9	118	95	1	17,774
1994	18-Dec	35	10	127	96	2	1,213,514
1995	17-Dec	31	10	120	96	4	1,023,928
1996	22-Dec	25	9	110	91		28,482
1997	21-Dec	26	10	116.5	92		67,434
1998	20-Dec	38	10	119	100	3	1,029,738
1999	19-Dec	31	8	90	100	1	512,982
2000	17-Dec	28	10	68	97		22,950
2001	22-Dec	20	8	50	89	1	18,990
2002	15-Dec	22	7	51	99	3	18,365

can be held (often about two weeks for much of CBC history), have been published as "count week" species (Heilbrun 1974). No count week species are included in the totals for count day nor are their numbers tallied; the total individuals column refers only to count day species.

The Memphis count has always been conducted in December. During its first 75 years, its date has ranged from 15 December (in 1974, 1991, and 2002) to 31 December (in 1944).

The center of the Memphis CBC circle is "Highland Heights," located in the north-central part of the city (35° 09′ N, 89° 56′ W). Presumably, this has always been the count's center; however, the center's location is not verifiable for counts conducted during the first 40 years of Memphis CBC history. Furthermore, the count has included new areas of coverage over the years. For instance, the Shelby County Penal Farm was first covered in 1951.

Ben Coffey was the compiler for 56 Memphis counts. He organized all of them through 1987, with the exception of four years while he served in the armed forces in World War II. During that time Ben's wife, Lula, compiled two counts (1942 and 1945), and chapter member Alice Smith also compiled two (1943 and 1944). Martha Waldron compiled twelve counts (1988-1999), while Rob Peeples compiled three (2000-2002).

Weather. Unfortunately, weather data for many counts conducted during the early years of the Memphis CBC are either incomplete or lost to history. Verifiable temperature has ranged from 12°F (2000) to 72°F (1984). The highest known wind speed was 46 mph (1997). Rain was noted during at least 11 counts. Snow was recorded in 1929, 1935, 1963, 1969, and 1973, with 14 inches falling during count day in 1963.

Effort. The number of participants on the Memphis CBC has ranged from 1 (1928) to 47 (1993). Generally, the number of observers attained its highest levels during the 1970s, 1980s, and 1990s. In 2001, however, there were but 20 observers, the lowest total since 1968. A comprehensive tally of all Memphis counts (1928-2002) revealed that 368 individuals participated as observers on Memphis CBCs during that period.

The number of parties, or groups of observers, in the field has never exceeded 15 (1990). Data for total number of parties is unavailable for most years prior to 1942 and for 1970.

The number of party-hours of effort for a CBC is a cumulative measure of the time spent in the field by each of the separate parties. The number of total party hours for most of the early Memphis counts is not known. The highest number of party hours accumulated was 130 (1985); the lowest since 1939 was 28 (1963) when heavy snowfall on the day of the count discouraged many observers and parties.

Observer effort is a significant factor in the counts of bird species and individuals generated by CBCs. To increase the value of CBC data, a measure of the effort involved is figured into most calculations used to indicate relative abundance and population trends of species. This standardization of data, most frequently

using the party-hours total, allows more valid comparisons of information derived from different years of a count and from different CBC circles (Peterjohn 2000).

Tanner (1985) uses the number of party-hours recorded to analyze historical data from Tennessee CBCs. Comparative abundance and species trends in his comprehensive analysis were derived using statistical models that account for variation in observer coverage (Tanner 1985). Because effort data were not available for all counts, data presented here have not been standardized. Total counts of species and individuals are presented, and when available, effort data are provided in Table 1.

SPECIES COUNTS

Species totals. The number of species on Memphis CBCs has ranged from 42 (1928) to 100 (1998 and 1999). Generally, the number of species found on the count has increased steadily over its 75 years. In 1929, 59 species were noted. Seventy species were first recorded in 1935, and the 1951 count was the first to break 80, with 82 species. That total was not exceeded until 1978, when 87 species were counted. A count of 90 was first attained in 1983 (91 species); all years since 1987 have tallied at least 90 species, the only exception being 2001, when 89 species were noted.

The cumulative species total for the 75 years (1928-2002) is 166 (Table 2). Table 2 also lists three former "species" which are now regarded as subspecies (AOU 1998): Harlan's Hawk (*Buteo jaimacensis harlani*), Red-shafted Flicker (*Colaptes auratus cafer*), and Oregon Junco (*Junco hyemalis oreganus/mearnsi*). On the other hand, data for "Blue Goose" are subsumed within data for Snow Goose (*Chen caerulescens)*, since white and blue morph Snow Geese have not been tallied separately (by Memphis counters or compilers) since 1990.

Total individuals. The lowest total for individuals occurred in 1929, with 1,973 birds counted. In a general sense, totals for individuals have increased over time and are positively correlated with numbers of participants. The total number of individual birds has exceeded 16,000 every year since 1972. Nonetheless, the individual bird count has fluctuated greatly due to unpredictable and sometimes very large numbers of starlings and blackbirds. Species in this group include European Starling (*Sturnus vulgaris)*, Red-winged Blackbird (*Agelaius phoeniceus*), Common Grackle (*Quiscalus quiscula*), and Brown-headed Cowbird (*Molothrus ater*).

Solely because of large numbers of these four species, the Memphis CBC individual total has exceeded 1 million nine times, first in 1955 and most recently in 1998. The largest total of individuals for the Memphis CBC was achieved in 1957 when over 3.5 million birds were tallied, with blackbirds and starlings accounting for the vast majority of this total. Furthermore, that particular count bestowed upon Memphis the distinction (perhaps dubious) of accumulating the highest total of individuals among all Audubon CBC's worldwide for that year.

Species not counted in early years. Christmas Bird Counts in Tennessee, and throughout North America, did not begin counting Rock Pigeons (*Columba livia*)

Table 2. Summary of number of counts, high individual counts, and average number of individuals per count for all species observed on the Memphis CBC, 1928-2002

	# Counts (out of 75)		High Count	Averages		
Species	Count Day	Count Week	# Indiv.	1st 50 yrs	Last 25 yrs	All 75 yrs
Pied-billed Grebe	56	1	50	1.8	15.7	6.5
Horned Grebe	2		3	0.1	>0.1	0.1
American White Pelican	2		27	0.0	1.6	0.5
Double-crested Cormorant	26	1	300	8.8	43.6	20.4
American Bittern	1		1	>0.1	0.0	<0.1
Great Blue Heron	58		72	2.1	32.0	12.1
Great Egret	3		5	0.0	0.3	0.1
Little Blue Heron	2		1	>0.1	0.0	<0.1
Green Heron	2		1	0.0	0.1	<0.1
Yellow-crown. Night-Heron	2		1	0.0	0.1	0.0
Black Vulture	28	2	28	3.9	0.2	2.7
Turkey Vulture	43	2	113	8.9	0.8	6.2
Greater White-front. Goose	2		60	0.0	3.3	1.1
Snow Goose	20		553	2.9	45.8	17.2
Canada Goose	43	1	865	13.5	178.2	68.4
Mute Swan	9		5	0.0	0.9	0.3
Wood Duck	45		104	2.7	32.8	12.8
Gadwall	28		650	0.3	92.8	31.1
American Wigeon	18		207	0.2	10.4	3.6
American Black Duck	27	3	256	6.9	1.2	5.0
Mallard	70	2	1223	76.7	403.7	185.7
Blue-winged Teal	12		200	6.0	2.3	4.8
Northern Shoveler	28	1	245	0.2	32.8	11.1
Northern Pintail	14	3	100	5.0	0.7	3.6
Green-winged Teal	20	2	40	0.8	4.0	1.8
Canvasback	26	1	101	2.3	8.7	4.4
Redhead	14	2	10	0.4	1.3	0.7
Ring-necked Duck	53	1	500	30.9	71.6	44.4
Greater Scaup	2		10	0.0	0.6	0.2
Lesser Scaup	62		1580	58.1	191.7	102.7
Long-tailed Duck	2		3	0.0	0.2	0.1
Bufflehead	14	1	30	0.8	1.6	1.1
Common Goldeneye	17	1	47	0.6	4.4	1.9
Hooded Merganser	26		73	0.5	10.9	4.0
Common Merganser	3	1	8	0.0	0.3	0.1
Red-breasted Merganser	5		7	0.3	>0.1	0.2
Ruddy Duck	24		61	0.4	11.2	4.0
Osprey	1		1	0.0	>0.1	<0.1
Bald Eagle	6		2	>0.1	0.2	0.1
Northern Harrier	68		29	3.7	10.6	6.0

	# Counts (out of 75)		High Count	Averages		
Species	Count Day	Count Week	# Indiv.	1st 50 yrs	Last 25 yrs	All 75 yrs
Sharp-shinned Hawk	33		7	0.2	2.6	1.0
Cooper's Hawk	45	2	10	1.5	1.9	1.6
Red-shouldered Hawk	59	1	17	4.0	2.8	3.6
Red-tailed Hawk	71		85	18.0	61.4	32.5
Rough-legged Hawk	11	3	2	0.2	0.1	0.2
American Kestrel	75		50	16.8	27.2	20.3
Merlin	6		2	>0.1	0.2	0.1
Peregrine Falcon	4	1	1	>0.1	0.1	0.1
Wild Turkey	23		89	1.8	13.2	5.6
Northern Bobwhite	73	1	183	69.6	50.2	63.1
American Coot	47		309	4.7	66.4	25.3
Sandhill Crane	0	1	0	0.0	0.0	0.0
Killdeer	74		489	82.5	197.5	120.8
Greater Yellowlegs	3	1	4	0.0	0.2	0.1
Lesser Yellowlegs	3		2	>0.1	0.1	0.1
Spotted Sandpiper	5		1	>0.1	0.1	0.1
Western Sandpiper	1		2	0.0	0.1	<0.1
Least Sandpiper	23		600	0.1	114.4	38.2
Pectoral Sandpiper	2		1	0.0	0.1	<0.1
Dunlin	5		13	0.0	1.2	0.4
Wilson's Snipe	69		120	15.1	22.4	17.6
American Woodcock	21		5	0.1	1.2	0.5
Franklin's Gull	1		1	0.0	>0.1	<0.1
Bonaparte's Gull	17		34	0.4	5.7	2.2
Ring-billed Gull	70		1761	55.3	362.4	157.7
Herring Gull	38		77	4.4	2.8	3.9
Forster's Tern	1	1	3	0.0	0.1	<0.1
Rock Pigeon	29		1578	0.1	504.9	168.4
Eurasian Collared-Dove	3		78	0.0	3.5	1.2
Mourning Dove	74		1173	102.0	487.6	230.5
Barn Owl	6	1	3	0.1	0.2	0.1
Eastern Screech-Owl	21	2	6	0.4	0.4	0.4
Great Horned Owl	39	1	5	0.4	1.6	0.8
Barred Owl	67		7	2.1	2.0	2.1
Short-eared Owl	8		9	0.4	0.3	0.4
Common Nighthawk	2	1	3	0.0	0.2	0.1
Ruby-throated/Black-chinned Hummingbird	1	1	1	0.0	>0.1	<0.1
Rufous/Allen's Hummingbird	2	1	2	0.0	0.1	<0.1
Belted Kingfisher	68		26	3.1	14.4	6.8
Red-headed Woodpecker	74		103	20.7	15.3	18.9
Red-bellied Woodpecker	75		177	57.6	115.0	76.7
Yellow-bellied Sapsucker	75		61	20.8	26.9	22.8
Downy Woodpecker	75		130	41.8	65.0	49.5
Hairy Woodpecker	74		30	13.1	13.0	13.1

	# Counts (out of 75)		High Count	Averages		
Species	Count Day	Count Week	# Indiv.	1st 50 yrs	Last 25 yrs	All 75 yrs
Northern (Yellow-shafted) Flicker	75		222	126.5	132.6	128.5
Pileated Woodpecker	65		30	4.0	15.5	7.8
Eastern Phoebe	45		11	0.9	2.9	1.5
Loggerhead Shrike	74		53	23.7	13.2	20.2
White-eyed Vireo	1		1	0.0	>0.1	<0.1
Blue-headed Vireo	9	2	3	0.1	0.3	0.2
Blue Jay	75		608	314.6	285.8	305.0
American Crow	75		305	65.1	137.9	89.3
Fish Crow	16	1	172	9.1	>0.1	6.1
Horned Lark	64		1335	106.4	216.6	143.1
Carolina Chickadee	75		313	137.3	189.8	154.8
Tufted Titmouse	75		177	71.6	90.0	77.7
Red-breasted Nuthatch	34	1	23	1.5	5.6	2.9
White-breasted Nuthatch	60	2	13	2.8	2.1	2.6
Brown Creeper	74	1	36	11.0	13.1	11.7
Rock Wren	1		1	>0.1	0.0	<0.1
Carolina Wren	75		243	97.9	136.3	110.7
Bewick's Wren	24		11	0.9	>0.1	0.6
House Wren	27	1	7	0.2	2.1	0.9
Winter Wren	75		50	15.7	11.0	14.2
Sedge Wren	6		4	0.1	0.2	0.2
Marsh Wren	3		1	>0.1	>0.1	<0.1
Golden-crowned Kinglet	75		179	49.7	43.0	47.5
Ruby-crowned Kinglet	74	1	124	24.4	48.3	32.3
Blue-gray Gnatcatcher	2		2	0.0	0.1	<0.1
Eastern Bluebird	67	1	130	31.2	30.2	30.9
Hermit Thrush	75		66	19.9	12.3	17.4
Wood Thrush	1		1	0.0	>0.1	<0.1
American Robin	74	1	5141	994.3	921.0	969.8
Gray Catbird	11		2	0.1	0.2	0.2
Northern Mockingbird	75		245	122.8	142.1	129.2
Brown Thrasher	75		65	21.7	22.7	22.0
European Starling	70	1	500000	48908.7	17194.6	38337.3
American Pipit	47	1	254	15.5	8.1	13.0
Sprague's Pipit	4		7	0.3	0.0	0.2
Cedar Waxwing	69	1	736	137.5	107.6	127.5
Orange-crowned Warbler	14	1	6	0.1	1.0	0.4
Cape May Warbler	1		1	>0.1	0.0	0.0
Yellow-rumped (Myrtle) Warbler	75		393	108.4	138.4	118.4
Pine Warbler	26	1	12	0.3	2.9	1.1
Palm Warbler	9		10	0.1	0.9	0.3
Black-and-white Warbler	1		1	>0.1	0.0	<0.1
Common Yellowthroat	9	1	2	0.1	0.3	0.1
Green-tailed Towhee	2		1	>0.1	0.0	<0.1

	# Counts (out of 75)		High Count	Averages		
Species	Count Day	Count Week	# Indiv.	1st 50 yrs	Last 25 yrs	All 75 yrs
Spotted Towhee	2	1	1	>0.1	0.0	<0.1
Eastern Towhee	75		206	77.7	55.0	70.1
American Tree Sparrow	13	1	12	0.8	0.2	0.6
Chipping Sparrow	19	1	76	0.2	9.1	3.2
Field Sparrow	75		512	173.2	173.7	173.4
Vesper Sparrow	25		22	0.6	6.5	2.6
Lark Sparrow	1		1	0.0	>0.1	<0.1
Savannah Sparrow	71		344	48.4	75.3	57.4
LeConte's Sparrow	36		7	1.2	0.7	1.0
Fox Sparrow	75		186	69.3	46.4	61.7
Song Sparrow	75		607	259.2	303.4	274.0
Lincoln's Sparrow	12		3	0.1	0.6	0.3
Swamp Sparrow	73	1	502	131.9	121.7	128.5
White-throated Sparrow	75		2284	1191.0	978.8	1120.3
Harris's Sparrow	13		11	0.7	0.1	0.5
White-crowned Sparrow	70		233	30.7	78.4	46.6
Dark-eyed (Slate-colored) Junco	75		1233	669.9	394.2	578.0
Lapland Longspur	24	2	911	65.5	10.4	47.2
Smith's Longspur	8	1	37	1.5	0.2	1.1
Northern Cardinal	75		813	466.8	437.0	456.9
Rose-breasted Grosbeak	1		1	0.0	>0.1	<0.1
Indigo Bunting	1	1	1	0.0	>0.1	<0.1
Dickcissel	1	1	2	>0.1	0.0	<0.1
Red-winged Blackbird	73	1	1201719	42029.0	131825.6	71961.2
Eastern Meadowlark	75		728	314.2	243.4	290.6
Western Meadowlark	17	4	8	0.9	0.2	0.7
Rusty Blackbird	63	1	2000	81.3	384.6	182.4
Brewer's Blackbird	21	2	134	6.8	3.9	5.8
Common Grackle	75		2500000	125807.2	20967.6	90860.7
Brown-headed Cowbird	71	1	350000	28685.4	2965.3	20112.1
Baltimore Oriole	1	1	1	0.0	>0.1	<0.1
Purple Finch	65	1	208	41.7	32.8	38.7
House Finch	19		487	0.0	98.4	32.8
White-winged Crossbill	1		2	>0.1	0.0	<0.1
Pine Siskin	15	1	52	2.7	3.2	2.8
American Goldfinch	75		489	171.4	112.4	151.7
Evening Grosbeak	2	1	114	0.0	4.9	1.6
House Sparrow	71		2190	453.5	353.9	420.3
Subspecies:						
Red-tailed (Harlan's) Hawk	5		1	>0.1	0.1	0.1
Northern (Red-shafted) Flicker	2		2	>0.1	0.1	<0.1
Dark-eyed (Oregon) Junco	2	1	2	0.1	0.0	<0.1

Total species = 166 (plus 3 subspecies)

until 1973. Many ornithologists and birders did not regard the introduced pigeon as sufficiently "wild," or worth counting, until then. Ben Coffey, in fact, listed "1" Rock Dove (i.e., Rock Pigeon) every year from 1974 to 1986. In 1987, his last year as compiler, he reported 998 pigeons. Since then, the species' numbers have been tallied each year.

The history of reporting House Sparrow (*Passer domesticus*) on CBCs has been considerably more complicated than that for Rock Pigeons. For the first 20 years of the Audubon CBC, the introduced sparrow was not counted on North American counts. Four counts in New York posted House Sparrow numbers beginning in 1922; but it was not until the 1930s that they were widely reported.

The first (1930) Christmas Bird Count compilation published for Tennessee (*Migrant* 2: 4-5) does not include a listing for House Sparrow, but the following year, for the 1931 CBC (*Migrant* 3: 7-8), the sparrow is listed as "Common" in species totals for Memphis and other Tennessee counts. The 1932 CBC compilation (*Migrant* 4:5-7) gives a numeric tally for Nashville, but lists no House Sparrows for Memphis. Thus, while other Tennessee CBCs began posting numbers for this species during the 1930s (*Migrant* 9: 6-9), Memphis continued to publish the sparrow simply as "Common" from 1933 to 1942. Consequently, the Audubon website does not show any House Sparrows from Memphis until 1943.

Increasing species. The Least Sandpiper (*Calidris minutilla*) benefited from the development of the EARTH Complex (system of sewage lagoons or "pits") during the early 1980s in southwest Memphis. This shorebird has been recorded every year since 1982 (with a high of 600 birds in 1994), but prior to that time it was noted only in 1946 and 1957.

In the last decade or two, generally milder winters may have resulted in increased frequency and numbers of several "half-hardy" species. Two of the best examples of this phenomenon are Orange-crowned Warbler (*Vermivora celata*) and Chipping Sparrow (*Spizella passerina*). The former has been noted on eight of the last 11 Memphis CBCs, with a high count of six (1995), although this species was unrecorded on the CBC until 1962. The Chipping Sparrow, though it first occurred in 1932, remained rare until the mid-1980s. It has been found on 10 of the last 12 counts, with a high of 76 (1997).

The introduced House Finch (*Carpodacus mexicanus*), as would be expected, increased dramatically in its first decade or so on the count. First recorded in 1982 (1), it was next found in 1985 (6). From then it increased each year until 1990, when 487 were tallied, the CBC's all-time high count. Numbers fluctuated but remained above 100 (except in 1993) during the early 1990s. More recently, the species seems to be declining; fewer than 100 were noted in 1997, 1999, 2001 and 2002.

Declining species. The Memphis count shows diminishing numbers for several species, including Northern Bobwhite (*Colinus virginianus*), a bird widely known to be declining significantly in the eastern U.S (Pardieck and Sauer 2000). The average number of bobwhites on the Memphis CBC decreased from about 70

birds for the period 1928-1987 to 17 for 1988-1997, and for the period 1998-2002, the average decreased to 2.6. The species was missed in 1992 and 2000. Its individual tally was 1 in 2001 and 2 in 2002.

Bewick's Wren (*Thryomanes bewickii*) is widely known to have declined nearly to the point of extirpation in the eastern U.S. (Pardieck and Sauer 2000). The Memphis count clearly illustrates this bird's demise in west Tennessee. It was found most years from 1933 to 1959, with a maximum of 11 (1945). There were none reported on Memphis CBCs in the 1960s. The only subsequent records of the species on this count were single birds counted in 1971 and 1986.

Several grassland birds still relatively common in the Great Plains were found in Memphis more frequently and in greater numbers during the 1950s than subsequently. As stated earlier, the Shelby County Penal Farm did not receive CBC coverage until 1951. As this was the location for many, if not most, of these grassland species, it probably should not be assumed that these birds were less common in Memphis in the decades prior to 1950 than they were after that year.

Sprague's Pipit (*Anthus spragueii*) was recorded on four counts, all during the 1950s. A high count of seven was attained in 1956. Formerly rather regular in Shelby County, it has become a very rare, if not accidental, visitor.

The Western Meadowlark (*Sturnella neglecta*) was found during all but two years from 1953 to 1967. It reached a high of eight (1957 and 1965). During the 1970s it was found on five counts: two birds were listed for 1978 and singletons during each of the other four years. Afterwards, the species was only noted once on count day (1993) and two times during count week (1989 and 1992).

Smith's Longspur (*Calcarius pictus*) shows a similar pattern. The bird was found during all but one year from 1953 to 1958, with tallies as high as 37 (1953) and 23 (1958). The species was not recorded again until 1988 (2). At that time it made a brief return, albeit in very small numbers. Smith's Longspur was found during count week (1989) and on count day in 1990 (2) and in 1991 (1), the most recent records for the count.

A bird that still winters commonly in the southern Great Plains, Harris's Sparrow (*Zonotrichia querula*) was surprisingly regular on Memphis CBCs of the past. First found in 1951, it was recorded every year from then until 1957. In that era, counts were more often of a few birds rather than of singletons, and the high count was 11 (1954). Two Harris's Sparrows were tallied in 1960. Singles were noted in 1964 and 1965, on three counts in the 1970s, and most recently, in 1999.

Two more species showing declines on the Memphis CBC are Purple Finch (*Carpodacus purpureus*) and Pine Siskin (*Carduelis pinus*). Both are irruptive and display great fluctuation in numbers. In recent years, however, a long-term decline in their presence and numbers is evident.

Though its degree of abundance always varied from one winter to the next, Purple Finch was formerly very regular on Memphis CBCs. It was found every year from 1935 to 1997 except 1944. Its high count was 208 (1939), but recent years have yielded discouraging numbers. No Purple Finches were found on the count in 1998 or 1999; 4 were counted in 2001; and only 1 was noted in 2000 and 2002.

The Pine Siskin, on the other hand, seems rather enigmatic. It was not recorded on the count until 1961 (10). Its maximum count occurred in 1963 (52). It was noted on another three counts during the 1960s, three counts in the 1970s, and eight during the 1980s. The last year of its occurrence on the CBC was 1989, when 29 were tabulated. Thus, the siskin seems to have returned to the rarity it showed before 1960.

Unusual species. Thirty-six species and two subspecies were found on three or fewer Memphis counts (Table 3). One of the most unusual species found was White-winged Crossbill (*Loxia leucoptera*). Two males seen on the 1954 count established Tennessee's first record of this northern vagrant (Moore 1954).

Two entries in the table (*Archilochus* sp. and *Selasphorus* sp.) refer to often indistinguishable congeneric pairs of hummingbirds (Ruby-throated/Black-chinned and Rufous/Allen's). An adult male Rufous Hummingbird (*Selasphorus rufus*), seen on count day 2001, is the only case in which a hummingbird found on the Memphis count has been identified to species.

About two-thirds of the species listed in Table 3, though unusual during winter in Memphis, are expected at other seasons. A few examples of some of the most seasonally unusual species include a Wood Thrush (1978) and a Black-and-white Warbler (1941), both found in Overton Park, and a Cape May Warbler (1975), seen at a feeder.

Several of the most unusual species in Table 3 are vagrants from the North American west. Green-tailed Towhee (*Pipilo chlorurus*), noted in 1952 and again in 1956, provided Tennessee with its first and second records, respectively (*Migrant* 27: 69). Spotted Towhee (*Pipilo maculatus*), meanwhile, listed on the counts for 1975 and 1976, was most remarkably found in 1975 in the same yard where an individual of the same species had been seen during count week in 1952 (Williams 1976). A Rock Wren (*Salpinctes obsoletus*) was found in 1956 at President's Island. It was deemed so unusual that it was collected, a practice not uncommon in earlier years of bird study. Moreover, this wren provided Tennessee's first record of that species (Smith 1956).

Species found only during "count week." There are five species recorded as "count week" which have never been found on count day. These species are not included in either Tables 2 or 3, or within the all-time species total (166) for the Memphis CBC.

A Black-bellied Whistling-Duck (*Dendrocygna autumnalis*) was seen by many observers at the Penal Farm from 24 November to 18 December 1985 (Waldron 1986), but could not be found on count day. Also at the Penal Farm, a Sandhill Crane (*Grus canadensis*) was observed the day after the count in 1988 (Waldron 1989).

A Yellow-billed Cuckoo (*Coccyzus americanus*) was discovered in Overton Park two days following the 1941 CBC, a fortuitous byproduct of monitoring the equally unseasonable Black-and-white Warbler, which was still present. The nearly

Table 3. Unusual species (detected on no more than 3 counts) observed during Memphis CBCs, 1928-2002. [yr] = Count week record.

Species	1928-1939	1940-1949	1950-1959	1960-1969	1970-1979	1980-1989	1990-2002
Horned Grebe			1951		1978		
Amer. White Pelican							1999, 2000
American Bittern			1950				
Great Egret							1996, 1998, 2002
Little Blue Heron	1936		1950				
Green Heron						1985	1994
Ylw-crowned Night-Heron					1978, 1979		
Greater White-fronted Goose							2000, 2002
Greater Scaup							1998, 2002
Long-tailed Duck						1985	1992
Osprey							2001
Lesser Yellowlegs				1969		1989	1999
Western Sandpiper							1990
Pectoral Sandpiper					1979	1987	
Franklin's Gull							1999
Forster's Tern						1984	[1994]
Eurasian Collared-Dove							2000-2002
Common Nighthawk							1993, [1995], 1998
Archilochus sp. (Ruby-throated/Black-chinned Hummingbird)							[1993], 1995
Selasphorus sp. (Rufous/Allen's Hummingbird)							[1995], 2000
Rufous Hummingbird							2001
"Red-shafted" Flicker			1959			1983	
White-eyed Vireo							1998
Rock Wren			1956				
Marsh Wren					1971, 1974, 1978		
Blue-gray Gnatcatcher						1984	1994
Wood Thrush					1978		
Cape May Warbler					1975		
Black-and-white Warbler		1941					
Green-tailed Towhee			1952, 1956				
Spotted Towhee			[1952]		1975, 1976		
Lark Sparrow							1992
"Oregon" Junco				1964, [1969]	1971		
Rose-breasted Grosbeak						1982	
Indigo Bunting						1988	[1995]
Dickcissel				[1969]	1972		
Baltimore Oriole							[1995], 1998
White-winged Crossbill			1954				
Evening Grosbeak				[1968]		1985, 1988	

emaciated cuckoo in "very weak condition" was able to summon what strength it had left to fly far enough to elude capture (Tucker 1942).

Yellow-breasted Chat (*Icteria virens*) has been recorded twice during count week. In 1968 an individual of this species was located in a holly hedge in downtown Memphis, both before and after count day (Patterson 1969). In 1983 another chat visited Lula Coffey's feeding station throughout most of the CBC period (Waldron 1984), but again was not seen the day of the CBC.

A Grasshopper Sparrow (*Ammodramus savannarum*) was collected in Germantown 24 Dec 1942 (Burdick 1942), four days after the count. The posting of this species as "count week" is one of many instances in the history of the Memphis CBC in which birds listed as such were found more than three days before or after count day, but were observed during the count period.

FUTURE OF THE MEMPHIS CHRISTMAS BIRD COUNT

There has been concern that some sections covered by the Memphis CBC circle are losing habitat due to suburban encroachment, a situation that will surely continue to worsen over time. Nonetheless, as parks and other protected lands constitute most of the areas covered, the count continues to maintain high species totals, as indicated by the 99 species counted during the 75th CBC (2002). The 76th Memphis Christmas Bird Count, compiled by Margaret Jefferson, was held 14 December 2003, and reached a record high species total (104). Among the unusual birds found during the 2003 count were Horned Grebe (*Podiceps auritus*), Long-tailed Duck (*Clangula hyemalis*), and Forster's Tern (*Sterna forsteri*). A record high count (161) of Eurasian Collared-Doves was also made. Additionally, the 76th count yielded two species new to the overall Memphis CBC list: Common Ground-Dove and Blue-winged Warbler.

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APPENDIX A

The CBC data used for this report relied on published information from the National Audubon Society website and *The Migrant* as well as original field cards and notes from CBC records in the Memphis TOS archives. Tables A.1 and A.2 list the actual counts used in the report versus those from the NAS website and *The Migrant* for cases where the original records differ from those in the published sources. Actual Counts have been verified from unpublished notes and/or field cards. Results listed as Previously Published are those which were reported incorrectly on the NAS website or in *The Migrant.*

Table A.1. Corrections to NAS website for the years: 1928-1930, 1932-1961, 1972-2002

Year	*Species*	Actual Count	Previously Published
1928	Field Sparrow	100	65
	Song Sparrow	108	Omitted
	Swamp Sparrow	53	Omitted
	Dark-eyed Junco	250	Omitted
1929	Eastern Phoebe	1	12
	Blue Jay	120	Omitted
	American Crow	2	Omitted
	Red-winged Blackbird	12	Omitted
1930	Mallard	20	Omitted
	American Coot	8	Omitted
1931	See *Migrant*		
1935	Red-breasted Nuthatch	6	Omitted
1939	American Pipit	71	271
	Lapland Longspur	200	Omitted
	Brown-headed Cowbird	1	Omitted
1941	Common Merganser	CW	Omitted
	Blue-headed Vireo	CW	Omitted
1942	Northern Flicker	106	Omitted
1943	Killdeer	22	2
1945	House Sparrow	200	CW

Year	*Species*	Actual Count	Previously Published
1947	Canada Goose	None	CW
1948	European Starling	43790	43890
	Eastern Meadowlark	192	129
1950	Lapland Longspur	12	120
1957	Red-winged Blackbird	2500000	250000
1959	Golden-crowned Kinglet	33	3
	Eastern Bluebird	CW	Omitted
	European Starling	100000	Omitted
	Red-winged Blackbird	250000	Omitted
	Common Grackle	150000	18928
	Brown-headed Cowbird	200000	3392
1961	Common Grackle	5000	500
For years 1962 to 1971 see *Migrant*			
1976	Northern Flicker	206	205
1978	House Wren	4	7
1981	Red-winged Blackbird	202108	282108
1986	Red-bellied Woodpecker	113	13
1988	Peregrine Falcon	1	Omitted
	American Robin	2945	29455
1991	Northern Cardinal	421	42
1992	Black Vulture	CW	2
	Turkey Vulture	2	Omitted
	Greater Scaup	None	12
	Lesser Scaup	12	Omitted
	Northern Bobwhite	CW	Omitted
	Fish Crow	CW	Omitted
1993	Lapland Longspur	1	Omitted

Year	*Species*	Actual Count	Previously Published
1995	Orchard Oriole	None	CW
	Baltimore Oriole	CW	Omitted
1998	Pied-billed Grebe	50	5
	Gadwall	650	Omitted
	American Wigeon	4	Omitted
	Northern Shoveler	82	Omitted
	Brown Creeper	14	Omitted
	Northern Cardinal	686	Omitted
	House Sparrow	272	Omitted
1999	Northern Bobwhite	7	1

Table A.2. Corrections to Memphis CBC records published in *The Migrant* for the years 1931 and 1962-1971

Year	*Species*	Actual Count	Previously Published
1931	Northern Flicker	51	35
	Downy Woodpecker	11	1
	Blue Jay	170	17
	Field Sparrow	16	Omitted
	Fox Sparrow	6	16
	White-throated Sparrow	870	Omitted
	Dark-eyed Junco	180	Omitted
1962	Canada Goose	None	15500
	Western Meadowlark	2	7
1965	European Starling	830	380
1968	Pileated Woodpecker	6	8

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MOVEMENT AND HARVEST OF GIANT CANADA GEESE IN EAST TENNESSEE

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ABSTRACT. Giant Canada Geese (*Anser canadensis maxima*) are generally considered to be non-migratory residents throughout the southeastern United States, although biologists have known for some time that Canada Geese in the southeast move long distances (e.g., from north Alabama to Akimiski Island in Canada). To better understand movements of Canada Geese in east Tennessee, we developed a database to track first- and last-known dates and locations of geese that were banded near the Department of Energy's Oak Ridge Reservation. Legband recovery data were also obtained from the U.S. Geological Survey's Bird Banding Laboratory in Laurel, Maryland. Approximately 1% of the nearly 3,000 geese that we tracked are known to have moved outside the State of Tennessee. We estimate that ~5% of Giant Canada Geese in central east Tennessee actually move outside the state and the other 95% are probably permanent residents. The known hunter harvest rate for geese in this study is ~18%, with the actual harvest estimated at 32%. Twenty-eight geese that we documented traveling outside of Tennessee were found in 11 other states and four Canadian provinces.

INTRODUCTION

Canada Geese of the giant race (*Anser canadensis maxima*) were first introduced into east Tennessee on Melton Hill Reservoir in 1972 (Nicholson 1997) after being extirpated from Tennessee sometime near the turn of the century (Hanson 1965). The geese breeding in Tennessee belong to this race, the largest goose in the world (Mowbray et al. 2002), although the Tennessee Valley population also contains members of the interior race (*A. c. interior*) (Bellrose 1980). The Canada Goose population in east Tennessee expanded throughout the 1970s and 1980s, and the population on the Department of Energy's Oak Ridge Reservation (ORR) was estimated at 1,500 birds in 1990 (Beauchamp and Pollock 1995). Five hundred and six geese were translocated off the ORR from 1995-1999, and we estimate the current population to be approximately 1,400.

Canada Goose roundups have been conducted annually on the ORR since 1988 and in other east Tennessee locations since shortly after their introduction in 1972. Individually coded neck collars were first placed on geese of the ORR in summer 1989, one year after the first legbands were used. Roundups were generally conducted during the last week of June, but varied from mid-June to mid-July, a period that coincides with a month-long flightless stage caused by a simultaneous wing molt (Palmer 1976).

The objectives of this study were to determine travel destinations of migrant Canada Geese that were banded in central east Tennessee, to determine the percentage of this population that moves outside the state, and to estimate the hunter harvest rate for this population. We use the term "migrant" to refer to geese known to move outside the State of Tennessee, but make no attempt to differentiate between migration, emigration, and movements of geese between states. We use the term "resident" to refer to geese that are not known to travel outside the State of Tennessee.

STUDY AREA

The ORR consists of the Oak Ridge National Environmental Research Park and land associated with Department of Energy (DOE) facilities in Oak Ridge, Tennessee. This reservation is approximately 13,900 ha and lies in the Ridge and Valley province, a physiographic region characterized by underlying formations of dolomite, limestone, and shale (Miller 1974). ORR elevations range from 229-384 m mean sea level, and the area is bordered on the south and west by the Clinch River/Melton Hill Reservoir (ORNL 2002). Approximately 70% of the ORR is in forest (principally native eastern deciduous) and 20% in old fields, agricultural areas, cutover forest lands, roadsides, and utility corridors (Washington-Allen et al. 1995). Geese in this area are primarily using water bodies, maintained grass and grassland (hay) habitats, corridor rights-of way, and sparsely vegetated or maintained lawn habitats associated with DOE security areas. The geese tracked in this study were banded in Anderson and Roane Counties in east Tennessee, on or near the ORR, from 1988-2001, or were sighted or recaptured here prior to March 2003. Destinations of migrant geese in this study include 11 states and four Canadian provinces (Fig. 1).

METHODS

Capture Technique and Banding Procedures

The summer roundups begin by herding the geese into pens that are temporarily set up at sites with concentrations of geese. Although materials and designs for capture pens have varied over the years, the capture method basically consists of the drive-trapping technique described by Cooch (1953).

Geese were generally released on site after aging and sexing by cloacal examination (Hanson 1949, 1967), recording recaptures, and attaching legbands and neck collars. Age at the time of banding was recorded as HY (hatching year) or AHY (after hatching year). HY birds at the time of capture are approximately eight to ten weeks old and are known to be resident birds incapable of flight. AHY birds could be any age of approximately 14 months or more; most are thought to have hatched in the ORR area but some may have hatched elsewhere. Initial banding locations for geese ($n = 2971$) in this study include 2,857 birds banded in Anderson and Roane Counties, 33 banded in east Tennessee outside these counties, two banded in middle Tennessee near Nashville, and 79 banded at locations unknown to the authors.

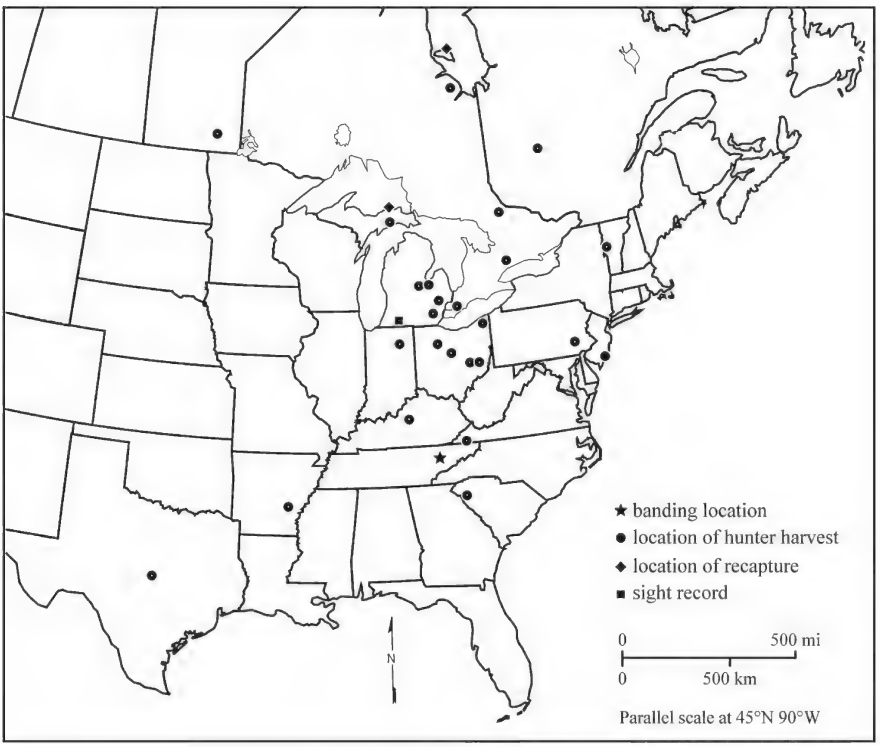

Figure 1. Approximate destinations of 28 Canada Geese banded in Anderson and Roane Counties, Tennessee, 1988-1999.

Uniquely-numbered size-8 aluminum legbands and hard plastic, cylindrical-type (7 cm x 5 cm diameter) neck collars were used. Neck collars were white with individually coded combinations of black letters and numbers. Goslings that were too small to hold neck collars were fitted with legbands and collared, if recaptured, in subsequent years. Procedures and materials used in this study were in accordance with the guidelines established by Rusch et al. (1990), the North American Bird Banding Program (Gustafson et al. 1997), and the Oak Ridge National Laboratory Animal Care and Use Committee (Protocol No. 0311). Nuisance geese have periodically been transported to off-site locations by Wildlife Services of the U.S. Department of Agriculture.

Data Management, Surveys, and Bird Banding Laboratory Returns

ORR waterfowl monitoring surveys have been conducted routinely since 1990 at varying intervals, ranging from once/month to once/week. Survey procedures (Roy et al. 2001) include the recording of all observations of Canada Geese and associated neck collars, and survey data from January 1994 through March 2003 were included in this study.

Records of 2,971 Giant Canada Geese that were banded, recaptured, or sighted in Anderson or Roane Counties were entered into a computer spreadsheet. We attempted to document the first- and last-known dates and locations of as many of these geese as possible. The majority of first-known dates and locations resulted from banding efforts conducted on or near the ORR. The majority of last-known dates and locations resulted from survey efforts and band returns reported by waterfowl hunters.

University of Tennessee Wildlife and Fisheries students conducted waterfowl hunter surveys on Melton Hill Reservoir from the 1991-92 through 1993-94 goose hunting seasons. These surveys documented 41 kills of banded Canada Geese, 24 of which had not been reported to the U.S. Geological Survey's Bird Banding Laboratory (BBL) in Laurel, Maryland. Additional hunter harvest data (516 reported kills) were retrieved from recovery reports received by the BBL. This study includes harvest data from the 1988-89 through 2001-02 hunting seasons. Also extracted from the BBL data were any reports of sightings, recaptures, or geese found dead from the ORR flock. Legband recovery data were included for all geese known to have used the ORR from 1988-2003, although BBL data were only current as of August 2002. Because harvest data were not included after the 2001-02 hunting season, geese which were newly captured and banded in summer 2002 or later were not included in the dataset.

Locations were generally recorded in 10-minute latitude/longitude blocks, defined by coordinates at the southeast corner of each block. Travel distances noted in Table 1 were calculated from the banding location to the center of the 10-minute recovery block using an online distance calculator. Distance estimates for select movements were verified using cartographic techniques. These distance estimates represent one-way flights, and it is worth noting that migrating Canada Geese typically follow relatively direct flight paths (Mowbray et al. 2002).

Harvest Reporting Rate

The Michigan Department of Natural Resources conducted a mail survey of waterfowl hunters following the 1998-99 hunting season. When survey results were extrapolated over the total number of goose hunters, an estimated 20,458 ± 3,216 goose bands were recovered and 10,973 ± 1,864 were reported during the three-year study period (Soulliere and Frawley 2001). We believe this 53.6% reporting rate to be reasonably accurate and have chosen it to calculate harvest estimates and the percent of migrant geese in the ORR population.

Reporting rates from waterfowl hunters for harvested legbands are typically cited in the 30-60% range, with rates having improved since the implementation (in 1995) of a 24-hr toll-free number for reporting recovered bands (MNDNR 1997). Although our data include some pre-1995 band recoveries, we used the Soulliere and Frawley reporting rate estimate because it is specific to goose hunters and is based on a large sample size.

RESULTS

Six hundred fifty-nine of the geese in this study are now documented as dead, including seven of those banded outside Anderson and Roane Counties. None of the 79 geese of unknown origin are known to have died. Disposition of the 659 known-dead geese is as follows: 540 harvested by hunters, 69 sacrificed for scientific study, 28 road-killed, 20 found dead of unknown causes, one train-killed, and one handling mortality.

Most movements of ORR Canada Geese occurred along a northerly vector, with east Tennessee representing the southern terminus of nearly all movements. Three geese recovered from northeast Alabama were not included in this study because they had been translocated in 1993 from the ORR to Nickajack Lake, only six kilometers northeast of the Tennessee-Alabama state line. These three geese were recovered within 40 km of the Nickajack release location. However, two other translocated geese are included in Table 1 because of significant flights made after translocation. Goose # 848-47715 made a flight of ~297 km to Arkansas, after being translocated ~394 km west to McNairy County, Tennessee, and goose # 878-56277 made a flight of ~545 km to Ohio, after being translocated ~40 km southeast to Monroe County, Tennessee. For consistency, travel distances and headings for these two geese (as with all geese) are represented in Table 1 as occurring between banding location and point of recovery, although clearly, any translocation effort can significantly impact these estimates. While a few geese made significant non-northerly movements, including those recovered in Arkansas, South Carolina, and Texas, all other recoveries came from areas north of the banding location (Fig. 1). Most movements occurred almost due north, as evidenced by the fact that more than half of the band recoveries came from Michigan, Ohio, and Ontario.

The dataset has many examples of geese for which their last-known locations occur in the same 10-minute block in which they were banded. Giant Canada Geese are somewhat unusual in that certain individuals travel or migrate long distances, while other individuals in the same population can be documented as almost never moving more than several kilometers. Only 28 of the 2,971 geese (<1%) were ever found outside Tennessee; these were documented in 11 other states and four Canadian provinces (Table 1). Twenty-five of these 28 geese were harvested by hunters, two were recaptured out-of-state, and one was a sight record reported to the BBL. It is not known if any of the three non-harvested geese in Table 1 are still alive, although all are known to have returned to the ORR. The most recent sighting of these geese came from # 868-42667 in November 2003. The longest-known flight (a one-way straight-line distance of 1,940 km) of a goose in this study was from the ORR to Nunavut, Canada and back to the ORR (Table 1). There were no reports (i.e., sightings, recaptures, or band recoveries) of 1,165 geese after their initial capture, indicating that some travels may represent classic migratory movements.

Table 1. Destination or location of harvest, legband number, age at banding, sex, age at harvest, distance traveled, and heading for 28 Canada Geese banded in Anderson and Roane Counties, Tennessee, 1988-1999 (band numbers in bold type are recapture or sight records; all others are hunter-harvested geese).

Destination	Band	Age-B[1]	Sex	Age-H[2]	Dist[3] km (mi)	Heading[4]
Arkansas	848-47715[5]	AHY	M	5	691 (429)	259.8° W
Indiana	818-41291	HY	F	3	NA[6]	NA
Kentucky	808-71071	HY	F	2	234 (145)	335.9° NNW
Michigan	818-41342	HY	F	1	763 (474)	5.7° N
	868-42667	HY	F	11	1203 (747)	353.6° N
	828-75658	HY	F	3	677 (421)	346.4° NNW
	848-47760	HY	F	1	NA	NA
	828-03133	HY	M	1	1154 (717)	354.5° N
	828-77093	AHY	F	5	834 (518)	2.8° N
	828-76527	AHY	M	10	705 (438)	4.5° N
New Jersey	868-42411	AHY	M	4	963 (599)	63.2° ENE
Ohio	828-77033	HY	F	1	567 (352)	5.0° N
	878-56277[5]	HY	F	1	520 (323)	30.5° NNE
	578-55975	HY	M	1	485 (301)	17.1° NNE
	828-75809	AHY	M	2	672 (418)	23.8° NNE
	848-47730	AHY	M	3	509 (316)	28.4° NNE
Pennsylvania	828-77295	AHY	F	2	839 (521)	53.4° NE
South Carolina	868-42636	AHY	M	2	194 (121)	143.8° SE
Texas	828-75626	HY	M	8	1493 (928)	255.2° WSW
Vermont	808-70825	AHY	M	10	1303 (810)	42.6° NE
Virginia	828-77299	AHY	F	5	198 (123)	70.3° ENE
Nunavut Can.	**828-75988**	AHY	F	4	1940 (1206)	6.0° N
Ontario Can.	828-76589	HY	F	1	723 (449)	15.5° NNE
	828-77016	HY	F	1	1210 (752)	15.7° NNE
	828-76701	HY	M	5	1004 (624)	22.7° NNE
	828-77078	AHY	M	2	1829 (1136)	6.2° N
Manitoba Can.	828-77247	AHY	M	6	1902 (1182)	330.4° NNW
Quebec Can.	828-77074	AHY	M	3	1651 (1026)	20.7° NNE

[1] AGE-B: Age at time of initial banding; HY = hatching year, AHY = after hatching year

[2] AGE-H: Age at time of harvest or last sighting; minimum number of whole years bird is known to have survived

[3] DIST: Minimum one-way straight-line distance traveled

[4] HEADING: Compass direction of straight-line travel from banding location to known destination

[5] Translocated prior to harvest

[6] NA: Data not available because of inexact reporting of harvest location

Student surveys of waterfowl hunters (conducted locally in the field) found only 41.5% (17 of 41) of these recovered bands were reported by hunters to the BBL, the U.S. Fish and Wildlife Service, or state wildlife agency. These data may be biased in that hunters may feel less compelled to "officially" report recovered bands after sharing the information with surveyors. The small sample size and potential reporting bias are reasons not to base hunter harvest estimates on this 41.5% reporting rate. Nonetheless, this rate lies within the 30-60% range, and as might be expected based on pre-1995 data, is less than the 53.6% rate reported by Soulliere and Frawley (2001).

We know that 18.2% (540/2971) of the banded geese in this study were harvested by hunters, yet the expected harvest rate (e) is calculated to be 32.4%, as determined by the following equation;

$$e = r/0.536p$$

where r = reported harvest, 0.536 = reporting rate, and p = banded population

Although 540 geese were known to be harvested in this study, only 516 were actually reported (the other 24 were only learned of through student surveys); thus r = 516, p = 2971, and e = 0.324.

The actual number of hunter-harvested geese in this study is estimated to be 963, determined by multiplying the expected harvest rate (e) by the banded population (p). Given the paucity of public hunting venues in east Tennessee, we were surprised to learn that 18.2% of the geese in this study were harvested by hunters, and that the actual harvest was expected to be 32.4%. Using a lower reporting rate, such as the 41.5% rate calculated from field surveys, would result in an even higher expected harvest.

Because 25 geese are known to have traveled outside the state and been harvested by hunters (y), the number of geese expected to be harvested out-of-state (x) is 47, as determined by the following equation;

$$x = y/0.536$$

The expected number of migrant geese in the population (m) is approximately 145, as determined by the following equation;

$$m = x/e$$

The percent of migrants in the population is estimated to be 4.9%, determined by dividing the expected number of migrants in the population (m) by the banded population (p). A similar estimate is calculated by dividing the 25 geese reported as harvested out-of-state by the total reported harvest of 516 birds. In other words, 4.8% (25/516) of the reported harvest occurs outside Tennessee, and we assume this value also represents the percentage of unharvested geese occurring outside the state. From these calculations, it follows that slightly more than 95% of the population are resident birds which rarely, if ever, leave the State of Tennessee.

DISCUSSION

As Canada Geese migrate, more geese are potentially available to harvest in northern states than in southern states because geese are shot during migration

and some individuals winter in northern states (Hestbeck 1994). Given that Tennessee is a southern state, one might expect a lower harvest rate for ORR geese than for northern states or for an entire flyway. A possible equalizing factor, however, is that most southern states experience longer goose hunting seasons than do northern states. Even though we estimate that only ~5% of ORR geese migrate, the 32.4% expected hunter-harvest rate we calculated for these geese is remarkably similar to flyway harvest estimates calculated by J. B. Hestbeck (Hestbeck 1994, LaRoe et al. 1995).

A 31% harvest rate was calculated by Hestbeck, as a three-year average, for Canada Geese in the Atlantic Flyway (LaRoe et al. 1995). This estimate was for the 1990-92 period, which occurred during our ORR study, and was down slightly from the 34% harvest rate that he estimated for the 1982-84 period. These estimates are calculated by dividing the estimated U.S. flyway harvest by the estimated flyway fall flight (Hestbeck 1994). Although Tennessee is considered part of the Mississippi Flyway, we documented flights of east Tennessee geese to five Atlantic Flyway states, four of which were included in Hestbeck's studies: New Jersey, Pennsylvania, South Carolina, and Virginia.

Hestbeck's estimates represent an annual harvest whereas our harvest estimate was calculated by examining a specified period of time (~15 yrs) to determine how many geese that were banded were also harvested during this period. His estimates also address harvest at the flyway-level whereas ours is applicable to a much smaller, regional scale. Although we did not calculate an annual harvest rate in our study, we would expect it to be slightly less than the 32.4% rate we estimated during the study period. It is interesting to note that these two very different approaches to estimating harvest rates have lead to nearly identical estimates.

If we continue to analyze legband recovery data reported after 2002 (without also inputting data for newly applied legbands), our 32.4% harvest estimate would increase. This increase is not expected to be large, however, and the rate of increase would slow over time, as young geese are more vulnerable to harvest than are adults (Hestbeck 1994). Our study corroborates this fact, as half of the harvested migrant geese from the ORR were in the 2+ year class or younger (Table 1), and 326 of the total 540 known harvest (60%) were in this cohort.

Our data suggest that the ORR goose population has been increasing in recent years after being down slightly from levels seen in the early 1990s. This temporary wane appeared to be a regional occurrence, likely attributable, in part, to aggressive translocation efforts in the late 1990s. The timely proposal to grant states increased flexibility in managing Canada Geese (U.S. Fish and Wildlife Service 2003) will likely prove necessary in controlling east Tennessee's goose population.

We believe our sample size is sufficient to conclude that most (~95%) ORR Canada Geese are non-migratory residents and that this population is subjected to significant hunting pressure (~32% harvest). Our calculations are dependent

on the Soulliere and Frawley reporting rate, and on accurate reporting and recording of legband data. While these findings should not be construed to be indicative of conditions throughout Tennessee, we believe this study accurately reflects, albeit presumptively, the movements and harvest of Giant Canada Geese in the eastern part of the state.

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MINUTES OF THE 2004 SPRING TOS BOARD MEETING

The spring meeting of the Tennessee Ornithological Society (TOS) was held on 30 April–2 May 2004 in the student center of the University of Tennessee at Chattanooga, hosted by the Chattanooga chapter. Field trips were offered to the following locations: Craven's House, Brainerd Levee, Standifer Gap Marsh, and Baylor School.

The meeting of the TOS Directors was called to order by TOS President Virginia Reynolds. Donna Ward, Recording Secretary, reported a quorum present. President Reynolds called the Directors' attention to the fact that since the last TOS meeting, we have lost two members who were important to the TOS: Barbara Finney, a former president, and George Mayfield, who died on April 21. Dr. Mayfield's father was a charter member. His mother was a pioneer female member of the organization. Dr. Mayfield was also a past president. Chris Sloan, treasurer, noted that the Mayfield family requested that contributions be made in Dr. Mayfield's memory to the TOS. The contributions should be sent to Chris Sloan or the next treasurer.

Secretary's Report. Donna Ward, Recording Secretary, requested that the directors please speak loudly and announce their names, so she can make the minutes accurate. She also asked that members come as close as possible to the front desk when giving reports. President Reynolds asked Theresa Graham and Carolyn Bullock to read the minutes of the Fall 2003 meeting. Carolyn Bullock made the motion that the minutes be approved as printed, with one correction. Theresa Graham seconded the motion. The vote of the Directors was unanimous to accept the motion.

REPORTS OF OFFICERS & DIRECTORS-AT-LARGE

Reports from Vice-Presidents:

East Tennessee: No Report

Middle Tennessee: No Report

West Tennessee: A report will be presented later in the meeting.

Reports from Directors-at-Large:

Louise Ward from West Tennessee was the only Director-at-Large present. She had no report.

TREASURER'S REPORT: Chris Sloan, treasurer, stated that the 2003 financial statements were published in the last issue of *The Warbler*. He noted that he will be happy to answer any questions from Directors about the financial statements. President Reynolds reported that Chris Sloan has tendered his resignation as treasurer of the TOS. She expressed appreciation to Chris for the work he has done as treasurer for the past two years. Mac McWhirter, Associate Dean of Administrative Services and Comptroller of Rhodes College of Memphis, has agreed to become the treasurer of the TOS. He is a former Director of Finance for the City of Memphis, former president of the Wolf River Conservancy, and is a CPA.

Chris Sloan stated that he is still working with the IRS to get the 501-C3 status

back in good standing. He plans to check to see exactly how much money is in the Conservation and Research Fund. He is still working with Morgan Stanley to develop a long-term investment strategy. He plans to use the savings account to earn some interest to qualify as an investment. He noted that the membership database is complete and usable. President Reynolds stated that an amount of $8,284.66 was spent last year on the publication of *The Migrant*.

Editor of *The Migrant*. Chris Welsh, editor of *The Migrant*, noted that he is currently working on the September 2003 issue of *The Migrant*. Chris asked members to please send reports to be published in *The Migrant*. President Reynolds expressed appreciation to Chris Welsh for doing such a good job as editor.

Editor of *The Tennessee Warbler*. Theresa Graham, editor of *The Tennessee Warbler*, stated that the August issue is the next issue of *The Warbler* and the deadline for that is June 30.

COMMITTEE REPORTS

Nominating Committee. Richard Connors, chairman of the Nominating Committee, said that Theresa Graham, Rick Knight, and Richard Connors have nominated Danny Gaddy as President-Elect. The directors unanimously approved the nomination of Danny Gaddy as our next president.

Finance Committee. President Reynolds said that George Payne has agreed to serve on the Finance Committee. She stated that members are needed from across the state to serve on the finance committee. She noted that members of the finance committee would work with the treasurer to make sure the finances are in good shape, and that the financial end of the organization is in good hands. Carolyn Bullock asked if the finance committee performs an audit. President Reynolds noted that with the change of treasurer, an audit should be performed. Dick Preston added that all tax-exempt organizations have to publicly disclose their finances on an annual basis and that the finances must be audited. Dick added that if the organization obtains grant money, most organizations require a certified audit. Richard Connors stated that the finance committee should include a total of five members.

Bird Records Committee. No Report

Conservation Research and Funding Committee. No Report

Conservation Policy Committee. President Reynolds stated that the TOS belongs to the American Bird Conservancy. As dues paying members, we are entitled to two representatives. Melinda Welton is one representative to The American Bird Conservancy. President Reynolds asked if anyone would like to become a representative of the American Bird Conservancy. She said that the group meets in Washington, D.C., and representatives have to pay their own expenses. Melinda Welton noted that the American Bird Conservancy Policy Council has changed its name to the Bird Conservation Alliance, and it represents 90 organizations that have some interest in bird conservation across the United States. In past years, the organization has commented on lake levels for the TVA, and the issue they have followed closely is mountain top mining and impact it has on forest interior species such as the Cerulean Warbler. Melinda said that she was invited to work with

the American Bird Conservancy to help draft a letter about an environmental impact statement put out by the Fish and Wildlife Service on mountain top mining in Tennessee.

DISTINGUISHED SERVICE AWARD: President Reynolds has been informed by the Distinguished Service Award Committee that there will not be a Distinguished Service Award given this year. She then read a list of the following persons that have received the Distinguished Service Award, and asked if members knew of anyone whose name had not been included:

1990
Sue Bell – Nashville
Mary Davant – Memphis
Lil Dubke – Chattanooga
Ken Dubke – Chattanooga
Katherine Goodpasture – Nashville
Lois Herndon – Lee R. Herndon Chapter
J. B. Owen – Knoxville
Noreen Smith – Memphis
Arlo Smith – Memphis
James T. Tanner – Knoxville

1991
Ben and Lula Coffey – Memphis
Helen Dinkelspiel – Memphis
George Mayfield – Columbia
Robbie Hassler – Byrdstown

1992
Martha Waldron – Memphis
Ruth McMillan – Middle Tennessee
Chuck Nicholson – East Tennessee

1993
Virginia Price – Nashville

1994
David Pitts – Member-at-Large

1995
George Payne – Memphis

1996
Carolyn Bullock – Memphis
Jim Campbell – Knoxville

1997
Ann Tarbell – Nashville

1999
Robert M. Hatcher – Nashville

2001
Susan McWhirter – Memphis
Fred Alsop, III – Lee R. Herndon Chapter

2002
Jim Ferguson – Memphis
Ruth Luckado – Highland Rim Chapter

Tracy Everson Muise asked President Reynolds if there are criteria for the Distinguished Service Award. President Reynolds responded that an individual or chapter can nominate anyone. The individual or chapter would need to write down what the nominee's qualifications or contributions to the TOS are and send them to the Distinguished Service Award Committee. President Reynolds listed the following members of the Distinguished Service Award Committee:

Chuck Nicholson – East Tennessee
Ruth Luckado – Middle Tennessee
Jim Ferguson – West Tennessee

COLLATERAL MATERIALS: Carolyn Bullock stated that she has patches and decals for sale. She presented the following report:

10 patches @ $2.00	$20.00
2 patches @ $2.50	$ 5.00
2 decals @ $3.00	$ 6.00
Total	$31.00

Chris Sloan mentioned that the organization has 20 or 30 copies of John Robinson's book *Annotated Checklist of Birds of Tennessee* for sale to the membership. Richard Connors suggested that we sell the book for $15.00, plus postage. President Reynolds asked Chuck Nicholson if the book sale could be posted on the website. President Reynolds suggested that Carolyn Bullock be in charge of the book sales.

TOS WEBSITE AND *THE MIGRANT* ON-LINE: Chuck Nicholson stated that this year when the April issue of *The Tennessee Warbler* was posted on the website, we had nearly 500 hits. Chuck noted that he receives 3-4 e-mails a week with questions on bird identification. He said that use of the website helps people become aware of the TOS. Chris Sloan said that 5-10 people have joined the TOS in the last two years because of the website. Ron Hoff asked, "Can I as a member choose not to receive the paper copy of *The Warbler* if it is going to be posted on the website?" Chris Sloan stated that there is a company based in Nashville that we could utilize to publish on-line membership directories and post photographs for about $10.00 a month. He said it would be an easy way to distribute the publication on-line. He plans to work with Chuck Nicholson to coordinate key features of the program. President Reynolds said the program would be helpful in posting local chapter newsletters for those who request them. Chris said that program would be helpful in generating mailing lists for *The Warbler*. Chuck Nicholson plans to present updated information about getting *The Migrant* on-line.

TN-BIRDS LISTSERVER: President Reynolds distributed copies of the report from Wallace Coffey, moderator of TN-BIRDS. She asked Linda Zempel to read the following report:

TO THE TOS BOARD OF DIRECTORS:

The TN-Birds Listserver continues to serve us well. Tennessee birders posted more than 400 messages in April as they watched the great wave of spring migration pass and welcomed our breeding species.

All of this has run smoothly since the Tennessee Ornithological Society took ownership of the list at the Fall 2003 meeting in Nashville.

We have enjoyed great cooperation from subscribers by their expressing specific locations of birds observed, spelling the names of birds fully, and documenting the observers and the counties.

Our regional Season Report editors gather a large volume of such reports to make up the bulk of seasonal migration information published in *The Migrant*. This is the historical data about Tennessee bird populations. The actual

number of reports available for the Season Reports has increased due to TN-birds. Reporting and gathering of bird observation has become easier and more timely.

Since February 1, 2002, TN-Birds has transmitted 5,134 reports posted by 254 different birders. An amazing number.

We currently have 413 subscribers. Of that number, 62% have posted to the TN-Birds Net. We are constantly growing, and we have a positive churn with more subscribing than unsubscribing.

It has been a good and productive winter and spring.

Respectively,
Wallace Coffey, Moderator, TN-Birds
Tennessee Ornithological Society

OLD BUSINESS

SPRING FORAY: Although the Directors were unable to plan a foray this year because of schedule conflicts, President Reynolds plans to contact David Trently about planning a foray for next year. Ruth Luckado stressed the importance of publicizing the foray so that people can be aware of it, and it was one of the best experiences that she had as a new TOS member. David Vogt explained that in the past, forays always began on Saturday morning. Ken Dubke stated that the concept of a foray involved having one coordinator, and if you were late, the coordinator would instruct you about where to go. Ron Hoff said the original idea of a foray was to study birds in counties where the breeding bird possibilities were not so well known. President Reynolds agreed to pass along all information provided to David Trently.

FALL MEETING: President Reynolds explained that it would not be feasible to plan the fall meeting at Pine Mountain State Park in conjunction with the Kentucky Ornithological Society. She asked permission to move the TOS meeting to Cookeville, Tennessee. President Reynolds plans to have the paper session at the fall meeting in Cookeville, and to ask Steve Stedman to suggest places in the Cookeville area to bird. Chuck Nicholson has agreed to be the coordinator to find the presenters for the fall meeting. President Reynolds said that about 30 or 40 people usually attend the fall meetings. Chris Sloan suggested that the fall meeting be held in September this year in order for members to observe hawks and passerines in migration.

NEW BUSINESS

WINTER MEETING: The following question was asked: "Should the TOS continue to have winter meetings?" Chris Sloan suggested that the TOS continue to plan winter meetings. Susan McWhirter added that the winter meeting was started by Bob Ford, and the original intention was for members to get together to discuss issues of importance to the TOS. Ken Dubke stated that he originally suggested to Bob Ford about using the winter meeting to discuss important projects. President Reynolds said that she will again discuss the winter meeting at the fall TOS meeting.

***THE MIGRANT* ENDOWMENT FUND:** President Reynolds asked if the TOS should keep *The Migrant* endowment fund as it now stands. At the time *The Migrant* fund was voted on, there was $8,000 in it. Since that time, it has grown exponentially. Ken Dubke noted that the 1980 issue of *The Migrant* will explain what *The Migrant* Endowment Fund includes. Chris Sloan explained that there are two variables that change from year to year. One is the cost of *The Migrant*. It is within a standard deviation, but it changes per issue according to the number of pages and the graphics, and it is going to vary, depending on the number of members that receive it. The other variable is that we need to figure out what to do with excess copies and what to do with the deficit. Chris recommended that we not have a separate fund for *The Migrant*, and continue to manage our investments. He stated that during most years, the amount of money generated from the investment funds will be enough to cover the cost of *The Migrant*. He does not see the need to segregate the funds for that purpose. He stated that right now the combination of income from the investment fund and income from membership dues is enough to cover our expenses, and most years we will have a three or four thousand dollar surplus. Chris is concerned that we have a sound policy for managing *The Migrant* fund, and that *The Migrant* is the most important legacy the organization has. George Payne added that he thinks that the finance committee needs to make recommendations to the Board of Directors. Chris Sloan recommended that Chris Welsh, editor of *The Migrant*, be placed on the finance committee. Ron Hoff made the motion that we have an audit of the financial books of the TOS to be conducted by an independent auditor at the earliest possible convenience. George Payne seconded the motion which passed, with one exception.

ANNUAL MEETING 2005: Dick Preston stated that Memphis will host the spring 2005 meeting. It will meet at the Holiday Inn, which is located at the I-40/240 Loop. Paul Baicich will be the speaker. The dates will be 29 April–1 May.

BREEDING BIRD SURVEYS: Chuck Nicholson, coordinator of Breeding Bird Surveys, stated that the following breeding bird surveys need to be conducted this year: Big Sandy, Peytonsville in Williamson County, and Pond Creek in Cheatham County. Melinda Welton and Richard Connors plan to do the Peytonsville area. President Reynolds asked Chuck to encourage younger birders to go along on the surveys. Dick Preston recommended that all 47 breeding bird survey routes be run. Dolly Ann Myers suggested that an article about the breeding bird surveys be placed in *The Warbler*. Dick noted that this is the 30th year that Chuck Nicholson has been coordinating breeding bird surveys.

TREASURER-ELECT: Chris Sloan made a motion that Mac McWhirter be elected the new TOS treasurer. Richard Connors seconded the motion. The vote of the directors was unanimous to accept the motion.

CHICKAMAUGA DAM PEREGRINES: Vickie Leather, the secretary of the Chattanooga chapter, introduced Dr. Jerry Faulkner, professor of environmental science at Chattanooga State. Dr. Faulkner stated that there is a pair of Peregrine

Falcons nesting on the railroad bridge just below Chickamauga Dam. His colleagues said that what is needed is a web cam on the nesting site. He talked with people in the computer services department at the university. He talked to people from Norfolk-Southern Railroad about accessing the bridge.

He said that the technology is there and that verbal permission has been given from Norfolk-Southern to put a web cam on the bridge focused on the nest to that observers can see what is going on. Dr. Faulkner stated that if the Peregrine Falcons do not return next spring, a back-up plan would be to bring the cameras onto the university campus where they have nesting Canada Geese, and adjacent to their property, the TVA transmission towers have nesting Great Blue Herons. Chris Sloan suggested that President Reynolds write a letter to Norfolk-Southern Railroad to encourage them in this endeavor. Chris made the motion that the TOS pledge $500.00 from our general fund toward this project, and then have Dr. Faulkner present the program to the Conservation and Research Committee to see if they would like to recommend a further amount. Dick Preston seconded the motion. Don Holt was concerned about the long-term use of the equipment, and about whether the system could be committed to be used for bird conservation in the future in some way. Dr. Faulkner said that as long as he is department head, the web cam will be used for scientific and education reasons. Chris Sloan amended his motion that the TOS contribute $500.00 to this project, with the stipulation that the information be reported to the organization and/or an article be placed in *The Migrant*. The vote of the directors was unanimous to accept the motion.

DUES: Chris Sloan would like to discuss whether or not the TOS should consider a $1.00 increase in dues. He would like to include the subject on the agenda at the fall meeting.

ADJOURN: Ruth Luckado made the motion to adjourn. The motion to adjourn was accepted.

ANNUAL MEETING: On 1 May 2004, members gathered for a dinner cruise aboard the Southern Belle Riverboat at 4:00. Virginia Reynolds, president, presided at the annual business meeting. She listed the following main events discussed at the Board of Directors meeting: Mac McWhirter has been elected treasurer of the TOS. The spring meeting will be held in Memphis 29 April through 1 May 2005. The Board of Directors voted to give $500.00 to support the web cam at the Peregrine Falcon nest on the railroad bridge below the Chickamauga Dam.

President Reynolds mentioned that Barbara Finney and George Mayfield, former state presidents, have died.

Danny Gaddy expressed appreciation to the following persons who helped to contribute to this spring meeting in Chattanooga: Kathy Lochwitz, Vickie Leather, and Ken Dubke.

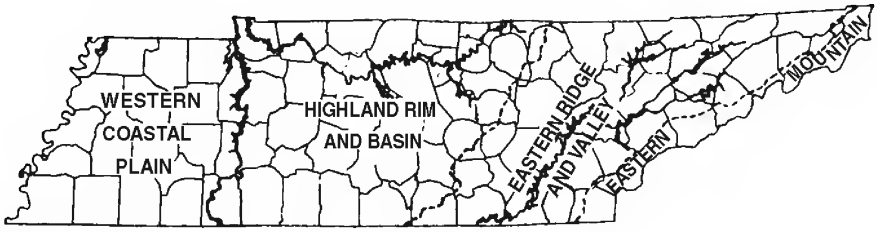
The dinner speaker was Scott Weidensaul. He spoke about bird migration.

Donna Ward,
Recording Secretary

The Migrant 75 (4): 157-162, 2004

THE SUMMER SEASON

RICHARD L. KNIGHT, Editor



1 JUNE - 31 JULY 2004

Temperatures were a bit cooler or, more precisely, less hot than usual this summer. Precipitation varied only slightly from normal in most areas. As such, these conditions should have been conducive to successful nesting for most species.

Several noteworthy breeding records were reported this season. Scissor-tailed Flycatchers nested in three regions. Double-crested Cormorants and Peregrine Falcons nested in two regions each. Other significant breeding reports included Western Kingbirds near Memphis, Great Egrets near Nashville, Henslow's Sparrow in White County, Least Bitterns and Virginia Rails near Chattanooga, and Yellow-bellied Sapsuckers in Carter County. Some late spring migrants and early fall migrants, plus a few lingering waterfowl, added diversity to the season list. A Neotropic Cormorant in Dyer County was the most notable rarity.

Standard Abbreviations

ad - adult
Co - County
Cr - Creek
ers - earliest reported sighting
et al. - and others
im - immature
Is - Island
L - Lake
lrs - latest reported sighting
max - maximum count
m.ob. - many observers
Mtn - Mountain
NWR - National Wildlife Refuge
WMA - Wildlife Management Area
yg - young

WESTERN COASTAL PLAIN REGION — Temperatures and rainfall were below normal during this period, but not remarkably so. The season did produce some notable sightings. A Neotropic Cormorant in Dyer County added another record to the rather few published observations of the species in the state. Two Hudsonian Godwits at different locations in early June represented record late dates for these northbound migrants, a species noteworthy at any time of year.

While nesting could not be confirmed for the Bell's Vireo observed at its previous breeding site in Lake County, a family of Scissor-tailed Flycatchers established a first nesting record for Shelby County. Moreover, an incredible five nesting pairs

of Western Kingbirds were noted at their now usual location, the EARTH Complex. Cooper's Hawk nests were found at four locations in Shelby County; this evidently increasing species was noted in almost half of the counties in West Tennessee (many other counties were not even visited this season).

Duck - Coot: **Gadwall**: 5 Jun (1) EARTH Complex (JRW); 10/19 Jul (3/1) White Lake WMA (WGC, BL, KCL). **American Wigeon**: 10/24 Jul (1) White Lake WMA (WGC, BL, KCL). **Blue-winged Teal**: 7 Jun (2 ad, 4 yg) EARTH Complex (JRW); 11 Jul (2 ad, 1 yg) White Lake WMA (JRW). **Northern Shoveler**: from May to 17 Jul (1-2) EARTH Complex (CHB, VBR, JRW); 27 Jun - 11 Jul (1) White Lake WMA (WGC, BL, KCL, JRW). **Northern Pintail**: 23 Jun - 24 Jul (1-2) White Lake WMA (WGC, BL, KCL). **Green-winged Teal**: 20 Jun - 28 Jul (1) White Lake WMA (WGC, KCL, JRW). **Hooded Merganser**: noted in Dyer & Lauderdale Cos (WGC, BL, KCL, JRW); 2 Jun (20) White Lake WMA (WGC), max. **Pied-billed Grebe**: breeding noted in Hardeman & Lake Cos, and at two locations in Shelby Co (CHB, WGC, Van Harris, KCL, WRP, Dick Preston, VBR). **American White Pelican**: noted thru period in Dyer, Lake & Lauderdale Cos; 9 Jun (193) White Lake WMA (WGC, KCL), max. **NEOTROPIC CORMORANT**: 7 Jun (1) White Lake WMA (WGC, KCL). **Double-crested Cormorant**: small numbers noted thru period in Dyer & Obion Cos (CHB, WGC, KCL, NaM, WRP, JRW). **Anhinga**: 13/20 Jun (1) Eagle Lake WMA, Shelby Co (Van Harris). **Least Bittern**: 23 Jun (1) Lake Co (KCL). **Tricolored Heron**: 21 Jul (1) White Lake WMA (CHB, VBR). **Black-crowned Night-Heron**: 18 Jul (1) Chickasaw NWR (JRW); 21 Jul (1) White Lake WMA (CHB, VBR). **White Ibis**: 6 Jul (1 ad) White Lake WMA (WGC); 18 Jul (1 im) Chickasaw NWR (JRW). **Bald Eagle**: 20/23 Jun (1 im/1 ad) Dyer Co (WGC, KCL); 18 Jul (2 im) Chickasaw NWR (JRW). **Sharp-shinned Hawk**: 2 Jul (1) McNairy Co (Mark Greene); 21 Jul (1) Dyer Co (CHB, VBR). **Cooper's Hawk**: noted in 9 West Tenn. Cos., with 4 nests in Shelby Co (JRW, CHB, Mark Greene, Dick Preston, VBR, MGW). **Common Moorhen**: 13-19 Jun (1) EARTH Complex (CHB, VBR, JRW); 21 Jun - 2 Jul (1) Shelby Farms (CHB, VBR, MGW). **American Coot**: 23 Jun (1) Obion Co (WGC, KCL); 11 Jul (1) White Lake WMA (JRW).

Plover - Tern: **American Golden-Plover**: 20 Jun (1) Dyer Co (WGC, KCL). **Semipalmated Plover**: 7 Jun (1) White Lake WMA (WGC, KCL), lrs; 11 Jul (1) Lake Co (JRW), ers. **Killdeer**: 17 Jul (761) EARTH Complex (JRW), max. **Black-necked Stilt**: noted in Lake & Lauderdale Cos, with nesting in Dyer & Shelby Cos (WGC, KCL, JRW, m.ob.). **Greater Yellowlegs**: 4/13/24 Jun (1) White Lake WMA (WGC, KCL, BL, NaM); 4/18 Jul (2/1) Lauderdale Co (JRW). **Lesser Yellowlegs**: 2 Jun (2) White Lake WMA (WGC), lrs; 4 Jul (4) EARTH Complex & (9) Lauderdale Co (JRW), ers. **Solitary Sandpiper**: 11 Jul (6) Lake Co (WGC, JRW), ers. **Willet**: 22 Jun (1) Tennemo Levee (WGC, KCL); 4/10 Jul (1/6) EARTH Complex (JRW); 8 Jul (1) Shelby Farms (WRP).**Spotted Sandpiper**: 10 Jul (1) EARTH Complex (JRW), ers. **HUDSONIAN GODWIT**: 2/4 Jun (1) White Lake WMA (WGC, KCL, NaM); 5-6 Jun (1) EARTH Complex (JRW, Q.B. Gray). **Sanderling**: 31 Jul (1) EARTH Complex (JRW). **Semipalmated Sandpiper**: 7 Jun (3) EARTH Complex (JRW), lrs; 10 Jul (1) EARTH Complex (JRW), ers. **Western Sandpiper**: 10 Jul (1) Lake Co (WGC, BL, KCL) &

(1) EARTH Complex (JRW), ers; 17 Jul (25) EARTH Complex (JRW), max. **Least Sandpiper**: noted thru period, EARTH Complex (JRW). **White-rumped Sandpiper**: 7 Jun (2) White Lake WMA (WGC, KCL), lrs. **Pectoral Sandpiper**: 10 Jul (1) Lake Co (WGC, BL, KCL) & (2) EARTH Complex (JRW), ers. **Dunlin**: 11 Jul (1) Mud L., Lake Co (JRW). **Stilt Sandpiper**: 10 Jul (1) EARTH Complex (JRW), ers. **Short-billed Dowitcher**: 11 Jul (2) Lake Co (BL, KCL) & (1) White Lake WMA (WGC), ers. **Wilson's Snipe**: 17/18 Jul (1) EARTH Complex (JRW/CHB, VBR, Steve Veltman). **Wilson's Phalarope**: 31 Jul (1) EARTH Complex (JRW). **Laughing Gull**: 26 Jun (1) EARTH Complex (JRW). **Ring-billed Gull**: 13/20/26 Jun (1) Tennemo Levee (WGC, BL, KCL); 23 Jun (1) Lake Co (WGC, KCL). **Caspian Tern**: 28 Jul (2) Island 13, Lake Co (WGC, KCL); 31 Jul (1) Shelby Co (JRW). **Common Tern**: 31 Jul (1) Shelby Co (JRW). **Least Tern**: 12 Jun (600+, many nests) Tipton Co (JRW), max. **Black Tern**: 2 Jun (7) White Lake WMA (WGC); 12 Jun (2) Tipton Co (JRW); 8 Jul (1) Shelby Farms (WRP); 31 Jul (3) EARTH Complex (JRW).

Flycatcher - Bunting: **Willow Flycatcher**: 20 Jun (1 singing) White Lake WMA (JRW). **Western Kingbird**: ad., nests, & yg noted thru period at EARTH Complex, with 5 active nests on 10 Jul (JRW, m.ob.). **Scissor-tailed Flycatcher**: 24 Jul (pair with 4 yg in nest) President's Is., Shelby Co (JRW). **Bell's Vireo**: 5 Jun (1) Black Bayou, Lake Co (NaM, WRP). **Bank Swallow**: 12 Jun (nesting colony) Tipton Co (JRW); 8 Jul (1) Shelby Farms (WRP). **Cedar Waxwing**: 4 Jun (2) Obion Co (WRP); 20 Jun (2) Fayette Co (Margaret Jefferson, Ed Thomas). **Blue-winged Warbler**: 28 Jul (1) Shelby Forest (WRP), ers for Shelby Co. **Black-and-white Warbler**: 14 Jun (1) Shelby Farms (VBR); 28 Jul (1) Shelby Forest (WRP). **Worm-eating Warbler**: 28 Jul (1) Shelby Forest (WRP). **Swainson's Warbler**: 1 Jun (1) Shelby Farms (WRP). **Scarlet Tanager**: 28 Jul (1) Shelby Forest (WRP). **Grasshopper Sparrow**: 25 Jul (2 ad, 4 yg) Dyer Co (JRW). **Song Sparrow**: noted thru period at EARTH Complex (CHB, VBR, Steve Veltman, Linda Zempel). **Painted Bunting**: from May to 2 Jul (1) Shelby Farms (CHB, WRP, MGW et al.); noted thru period at EARTH Complex (CHB, VBR, Linda Zempel).

Locations: Chickasaw NWR - in Lauderdale Co; EARTH Complex - in Shelby Co; Shelby Farms/Forest - in Shelby Co; Tennemo Levee - in Dyer Co; White Lake WMA - in Dyer Co.

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HIGHLAND RIM AND BASIN REGION — In the Middle Tennessee region, the two summer months had rather unremarkable weather. Both June and July were close to normal in both temperature and precipitation. Noteworthy were nesting records for Blue-winged Teal, Double-crested Cormorant, Great Egret, Cattle Egret, Scissor-tailed Flycatcher, and Henslow's Sparrow.

Duck - Rail: **Blue-winged Teal**: 20 Jun (pair with 4 yg) White Co (DAD), few breeding records for Upper Cumberlands. **Common Loon**: 6 Jun (1) Percy-Priest L., Davidson Co (Richard Connors). **Pied-billed Grebe**: 26 Jun (1) Old Hickory L (PDC, MAZ). **Double-crested Cormorant**: 2 Jun (1) Cane Cr. Park, Putnam Co

(SJS), new late date for Co; 16 Jun (2) Gallatin (MS); 26 Jun (2 pair at nests) Drake's Cr. (PDC, MAZ); 26 Jun (3 pair at nests) Old Hickory L (PDC, MAZ). **American Bittern**: 1 Jul (1) Heritage Marsh (DAD, SJS). **Great Egret**: 26 Jun (2 pair at nests) Drake's Cr. (PDC, MAZ). **Cattle Egret**: 4-16 Jun (1-2) Gallatin (MS); 6 Jun (2 nests with yg) Little Elder Is., Woods Reservoir, Franklin Co (John Sanders); 26 Jun (3) Drake's Cr. (PDC, MAZ); 26/28 Jun (22/37) Cage's Bend Rd., Sumner Co (MS). **Peregrine Falcon**: 28 Jun (1) downtown Nashville (Melinda Welton). **Virginia Rail**: 1 Jul (1) Heritage Marsh (DAD, SJS).

Flycatcher - Dickcissel: **Willow Flycatcher**: 9 Jun (1) Shelby Bottoms (PDC); 1 Jul (2) Heritage Marsh (DAD, SJS). **Scissor-tailed Flycatcher**: 29 Jun (pair with 1 yg) Hwy 142, Maury Co (Tommy Edwards); 3 Jul (pair with 4 fledged yg) Florence Rd., Rutherford Co (Frank Fekel, Terry Witt). **Loggerhead Shrike**: 29 Jun (pair with 3 fledged yg) DeKalb Co (Judy Fuson). **Yellow-throated Vireo**: 19 Jun (1) Marshall Co (DMo). **Sedge Wren**: 20 Jul (1) Heritage Marsh (SJS, DAD). **Swainson's Thrush**: 24 Jun (1, seen & heard) Nashville (Linda Kelly), first summer Nashville area record. **Scarlet Tanager**: 20 Jun (1) Marshall Co (DMo). **Henslow's Sparrow**: 4/11 Jul (3/4 ad & 2 yg) Heritage Marsh (SJS, Ed LeGrand/SJS, Winston Walden). **Grasshopper Sparrow**: 19 Jun (2) Marshall Co (DMo). **Song Sparrow**: 19 Jun (1) Shelby Bottoms (PDC); 20 Jun (1) Marshall Co (DMo); 7 Jul (1) Nashville (MAZ). **Blue Grosbeak**: 9 Jun (2) Shelby Bottoms (PDC); 20 Jun (3) Marshall Co (DMo). **Dickcissel**: 3 Jul (1) Florence Rd., Rutherford Co (Frank Fekel).

Locations: Drake's Cr. - in Sumner Co; Heritage Marsh - in White Co; Old Hickory L. - in Davidson & Sumner Cos.; Shelby Bottoms - in Davidson Co.

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CUMBERLAND PLATEAU/RIDGE & VALLEY REGION — East Tennessee had below average temperatures and above average precipitation this summer. Significant hatches of 17-year cicadas occurred in some areas. Notable breeding reports included Double-crested Cormorant, Least Bittern, Virginia Rail, Willow Flycatcher, and Scissor-tailed Flycatcher (two sites, plus singles at two other sites). The expansion of Eurasian Collared-Doves into two counties in upper East Tennessee was discovered.

Goose - Ibis: **Snow Goose**: 12 Jun (1) Bledsoe Co (Harold Birch). **American Black Duck**: 22 Jul (2) Eagle Bend (NeM). **Blue-winged Teal**: thru period (2+) Standifer Gap Marsh (DEP), following the nesting in May. **Double-crested Cormorant**: 25 Jul (15 nests) Rankin Bottoms, Cocke Co (Michael Sledjeski, Leslie Gibbens), triple the number of nests seen in this colony on 21 May. **Least Bittern**: thru period (8+ pairs fledged at least 18 yg) Standifer Gap Marsh (DEP). **Great Egret**: 4 Jul (12) Hamilton Co (Jimmy Wilkerson), max. **Snowy Egret**: 27 Jul (1) Eagle Bend (NeM). **Little Blue Heron**: 25 Jul (2 im) Rankin Bottoms, Cocke Co (Michael Sledjeski, Leslie Gibbens). **Cattle Egret**: 16 Jul (14) Kingston WMA, Roane Co (Boyd Sharp). **Black-crowned Night-Heron**: 27 Jul (1 im) Hamilton Co (David Spicer), unusual in southeast Tenn. **White Ibis**: 15-16 Jul (1 im) Knox Co (Ed Manous).

Osprey - Owl: **Osprey**: 2 Jul (1) Johnson City (Larry McDaniel). **Northern Harrier**: 19 Jun (1) Bradley Co (Bonnie Johnson). **Sharp-shinned Hawk**: 19 Jul (1) Hamilton Co (Jonnie Sue Lyons); 21 Jul (1) Greene Co (DHM). **Peregrine Falcon**: thru period (2 ad, 1 fledged yg) below Chickamauga Dam, Hamilton Co (m.ob.); 13 Jul (1) Limestone (DAH). **Virginia Rail**: thru period (2 pairs, one nest with 8 eggs, plus one group of fledged yg) Standifer Gap Marsh (DEP). **Pectoral Sandpiper**: 22 Jul (13) Eagle Bend (NeM), ers. **Stilt Sandpiper**: 27 Jul (1) Eagle Bend (NeM), ers. **American Woodcock**: 20 Jun (1) Norris, Anderson Co (Charles Nicholson). **Caspian Tern**: 16 Jul (2) Kingston Steam Plant, Roane Co (Boyd Sharp). **Eurasian Collared-Dove**: 6 Jun/20 Jul (1) Bulls Gap, Hawkins Co (John Rucker fide JWC); 31 Jul (2) Mosheim, Greene Co (DHM); both first Co records. **Barn Owl**: thru period (1-2) two sites in Greene Co (DHM).

Flycatcher - Dickcissel: **Olive-sided Flycatcher**: 1 Jun (1) Craven's House (KAC), late migrant. **Willow Flycatcher**: 5/8 Jun (completed nest/first egg in nest) Standifer Gap Marsh (David Hollie, Brandon Croft fide DEP), 1 nestling still being fed by ad. on 7 Jul; 11 Jun (1) Tri-cities Airport, Sullivan Co (DAH). **Scissor-tailed Flycatcher**: 12 Jun (1) Loudon Co (Dean Edwards), not relocated; 12 Jun/3 Jul (2 ad/2 ad, 3 yg) Ninemile Crossroad, Bledsoe Co (Roi Shannon/Carol Fegarido); 15 Jul (2 ad, 2 yg) South Pittsburg, Marion Co (Jerry Ingles); 24 Jul (1) Brainerd Levee, Hamilton Co (Jack & Vickie Leather), not relocated. **Warbling Vireo**: 5 Jun (ad feeding nestlings) Mossy Cr., Jefferson Co (KTOS). **Horned Lark**: 28 Jul (25+) Limestone (DAH). **Bank Swallow**: 12-26 Jul (up to 61) Greene Co (DHM). **Black-throated Green Warbler**: 25 Jul (4) Craven's House (KAC), early migrants. **Cerulean Warbler**: 25 Jul (2) Craven's House (KAC), early migrants. **Dickcissel**: 12 Jun/thru 31 Jul (1/1-2) separate Greene Co sites (DHM); thru 4 Aug (1-3) Limestone (DAH).

Locations: Craven's House - unit of Chattanooga & Chickamauga National Military Park, Hamilton Co; Eagle Bend - in Anderson Co; Limestone - in Washington Co; Standifer Gap Marsh - in Hamilton Co.

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EASTERN MOUNTAIN REGION — Daily temperatures were near average for the period, while precipitation was about two inches above normal. A fly-over American White Pelican was rather unexpected. Breeding Yellow-bellied Sapsuckers were noteworthy.

Grebe - Sapsucker: **Pied-billed Grebe**: 5 Jun (1) Sycamore Shoals SP, Carter Co (DAH, John Hay, Dianne Draper); 8 Jul (1) Cades Cove sewage pond, GSMNP (Jean Alexander). **American White Pelican**: 17 Jul (1, soaring) Hampton, Carter Co (BKS, David Thometz). **Double-crested Cormorant**: 5 Jun (1) Watauga R., Carter Co (John Hay, Dianne Draper); 29 Jul (1) Middlebrook L., Sullivan Co (JWC, Tom Laughlin). **Great Blue Heron**: 27 Jun (1) Carver's Gap, Roan Mtn (TSM); 9 Jul (1 flying over) Andrews Bald, GSMNP (Charlie Muise); both are unusual high elevation sightings. **Great Egret**: 12 Jul (1) Elizabethton (TSM); 28 Jul (2) South

Holston L., Sullivan Co (JWC et al.). **Yellow-crowned Night-Heron**: 6 Jun (nest with 3 yg) Sycamore Shoals SP, Carter Co (DAH). **Osprey**: 28 Jul (1) Middlebrook L., Sullivan Co (JWC, Tom Laughlin). **Sharp-shinned Hawk**: 5 Jun (1) Okalona, Carter Co (BKS). **Peregrine Falcon**: 28 Jun (2 ad, 2 yg) Alum Cave Bluff, GSMNP (Susan Hoyle, Kristine Johnson). **American Woodcock**: 8 Jul (2-3) Cades Cove, GSMNP (David Trently). **Black-billed Cuckoo**: 5 Jun (1) Holston Mtn, Carter Co (H.P. Langridge, Glen Eller). **Yellow-bellied Sapsucker**: 5 Jun (1) Miller L (Larry McDaniel, Gilbert Derouen); 20 Jun (pair feeding nestlings) Ripshin L., at 3400 ft. elevation (DAH); 26 Jun (pair feeding 2 fledged yg) Chestnut Ridge, at 3900 ft elevation (DAH, TSM); all three sites in Ripshin area of Carter Co & are first Co breeding records; 11 Jun (1, calling) near Whigg Meadow, Monroe Co (David Vogt).

Flycatcher - Siskin: **Least Flycatcher**: 5 Jun (1) Pond Mtn., Carter Co (TSM). **Brown Creeper**: 9 Jul (1 singing) Cades Cove, GSMNP (David Trently). **Hermit Thrush**: 10 Jun (2 singing) Roan Mtn (RPL). **Magnolia Warbler**: 5 Jun (1) Holston Mtn, Carter Co (Glen Eller). **Yellow-rumped Warbler**: 4 Jul (1) Clingman's Dome, GSMNP (Mike Tove), on North Carolina side. **Blackburnian Warbler**: 5 Jun (4) Pond Mtn., Carter Co (TSM). **Swainson's Warbler**: thru Jun (2 territories) Hoss Cove Gap, Washington Co (RPL); 20 Jun (1) Viking Mtn Road, Greene Co (DHM); 8 Jul (ad feeding fledged yg) Schoolhouse Gap trail, GSMNP (Jean Alexander). **Canada Warbler**: 5 Jun (1) Little Milligan, Watauga L., Carter Co (TSM), below 2000 ft elevation; 8 Jun (1) Shady Valley, Johnson Co (JWC, Chris O'Bryan, Ron Harrington), at 2260 ft. elevation; unusually low elevation sites. **Red Crossbill**: 10/27 Jun (20/3) Roan Mtn (RPL/TSM); 20 Jun (7) Ripshin L., Carter Co (DAH). **Pine Siskin**: 5-13 Jun/4 Jul (2-3) Hampton, Carter Co (BKS); 27 Jun (15+) Roan Mtn (TSM).

Locations: GSMNP - Great Smoky Mountains National Park; Roan Mtn - Carter Co.

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DAH - Don A. Holt
BL - Betty Leggett
KCL - Ken C. Leggett
RPL - Richard P. Lewis
TSM - Thomas S. McNeil
DHM - Don H. Miller
NaM - Nancy Moore
NeM - Nell Moore
DMo - Daniel Moss
DEP - David E. Patterson
WRP - W. Robert Peeples
VBR - Virginia B. Reynolds
MS - Michael Smith
SJS - Stephen J. Stedman
BKS - Bryan K. Stevens
MGW - Martha G. Waldron
JRW - Jeff R. Wilson
MAZ - Mary A. Zimmerman

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